Potion Logic

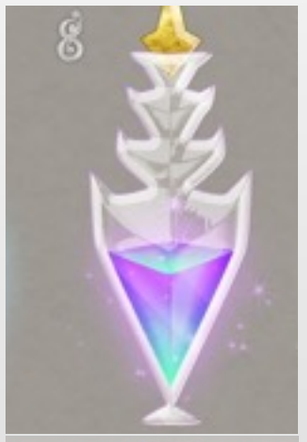
Nicolas Bauer

Potions

restoration

sleeping

invisibility



revive

Ingredients

eye of newt

lion's tail

frog

occamy egg

goblin's bone

dragon's blood

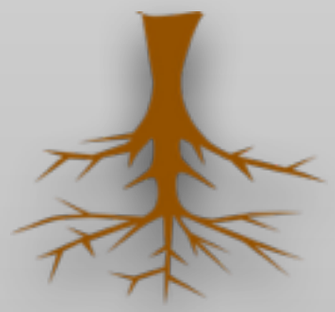
root of aconite

toadstool

We discovered a recipe!

To make the sleeping potion, you need to combine either dragon's blood or the root of aconite with a toadstool or an eye of a newt.

dragon's blood



root of aconite

toadstool

eye of newt

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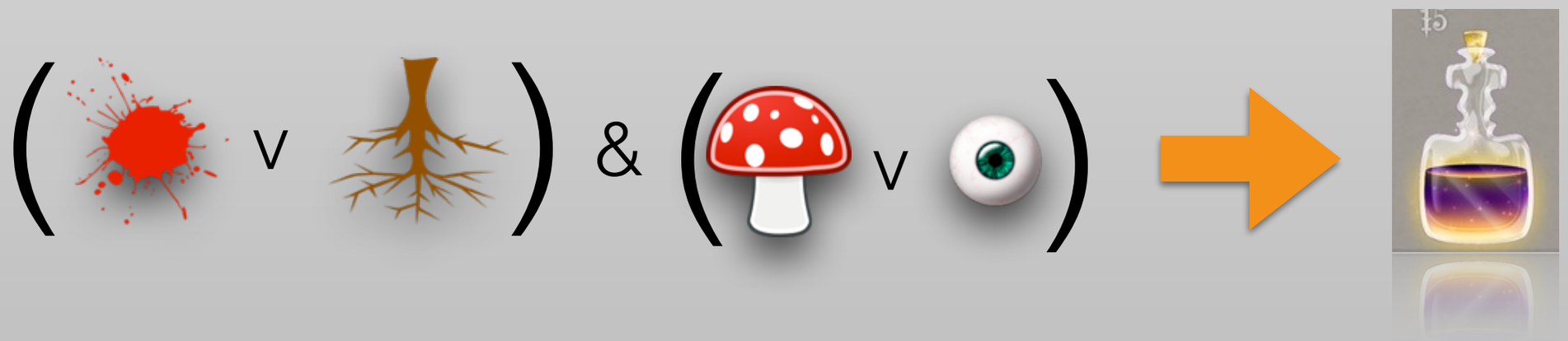


What do we need?

What are some possible ways to make this potion?

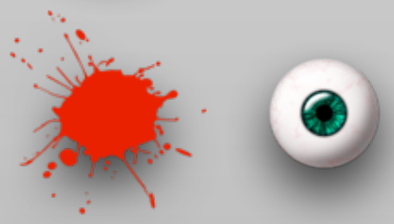
A 

B 

C 

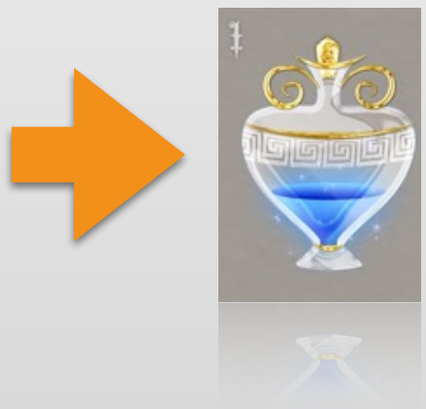
D 

E 

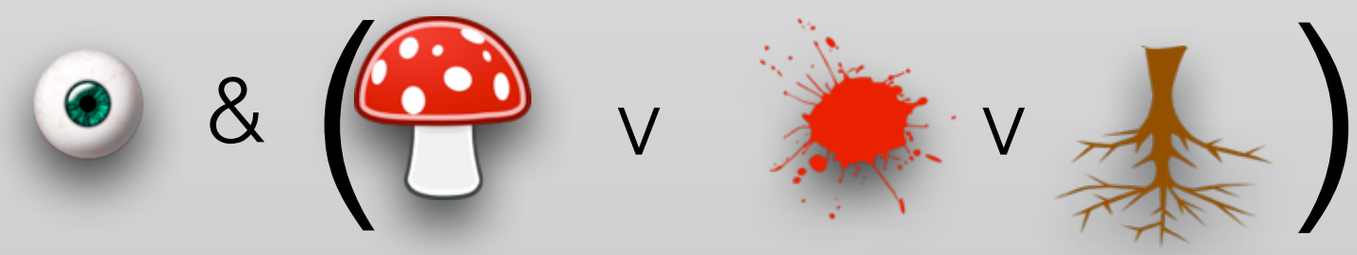
F 

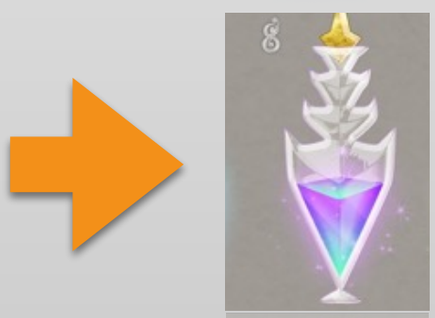
We Found More!

sleeping

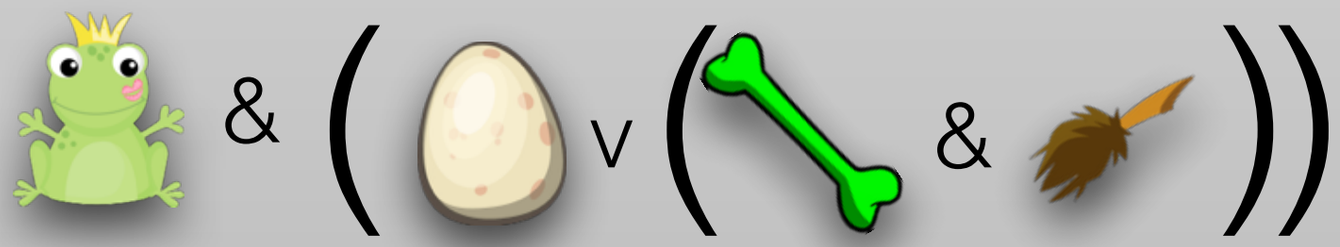


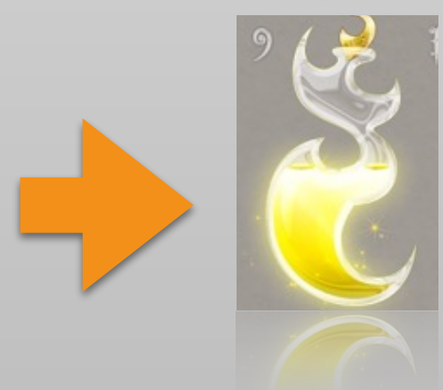
restoration





invisibility

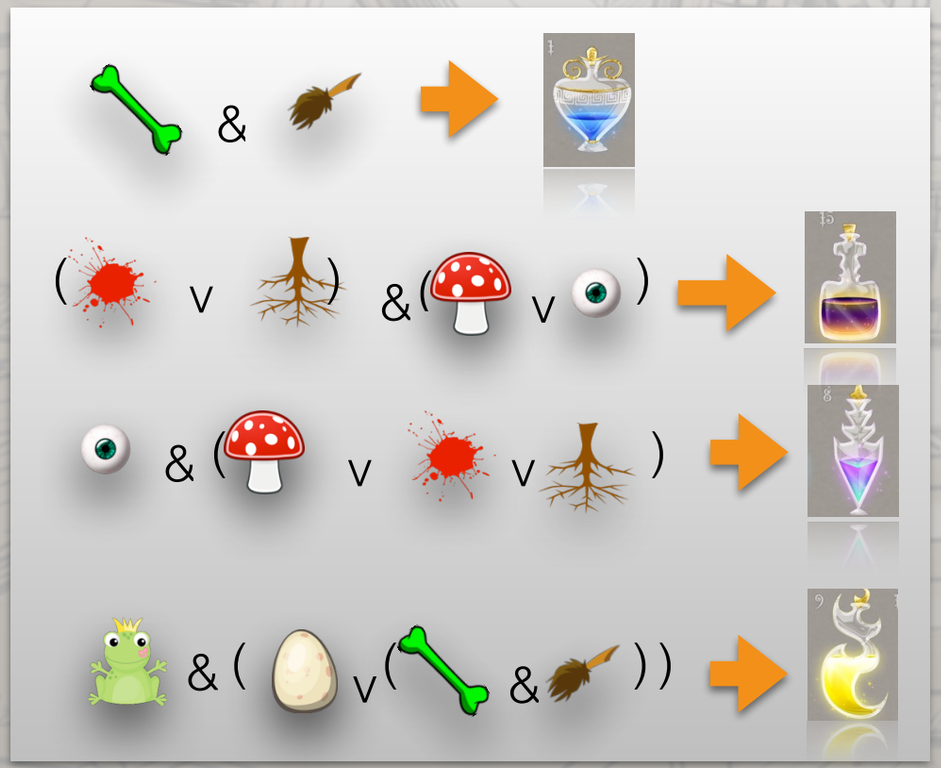




revive

Wizard Research

What possible potions can I make?



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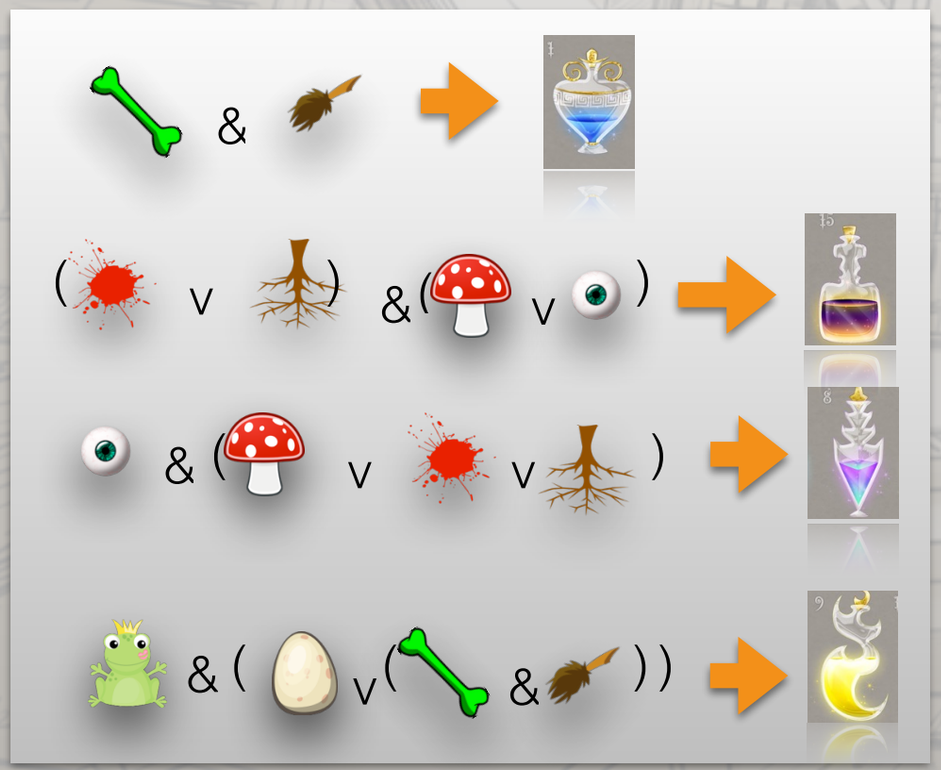
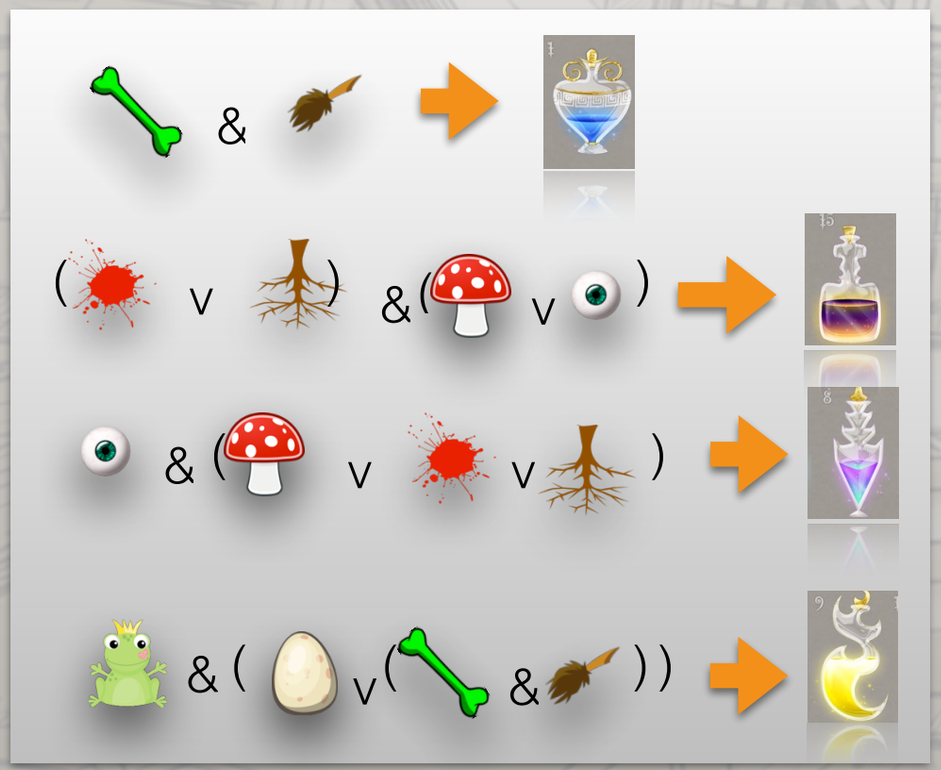


Wizard Research

What possible potions can I make?

?



Dear noble people, potions masters, and math wizards of the Land of Arithmetic –

'Tis I, your beloved Princess Calcula, trapped in the dungeon of the haunted Castle of Cosine. By flickering candlelight I write to beg you to find and rescue me from this gloomy cell before the clock strikes twelve on Halloween night.

The castle abounds with unsightly beasts, devilish spirits, and unknown dangers. For the success of our mission, I ask you to bring three things:

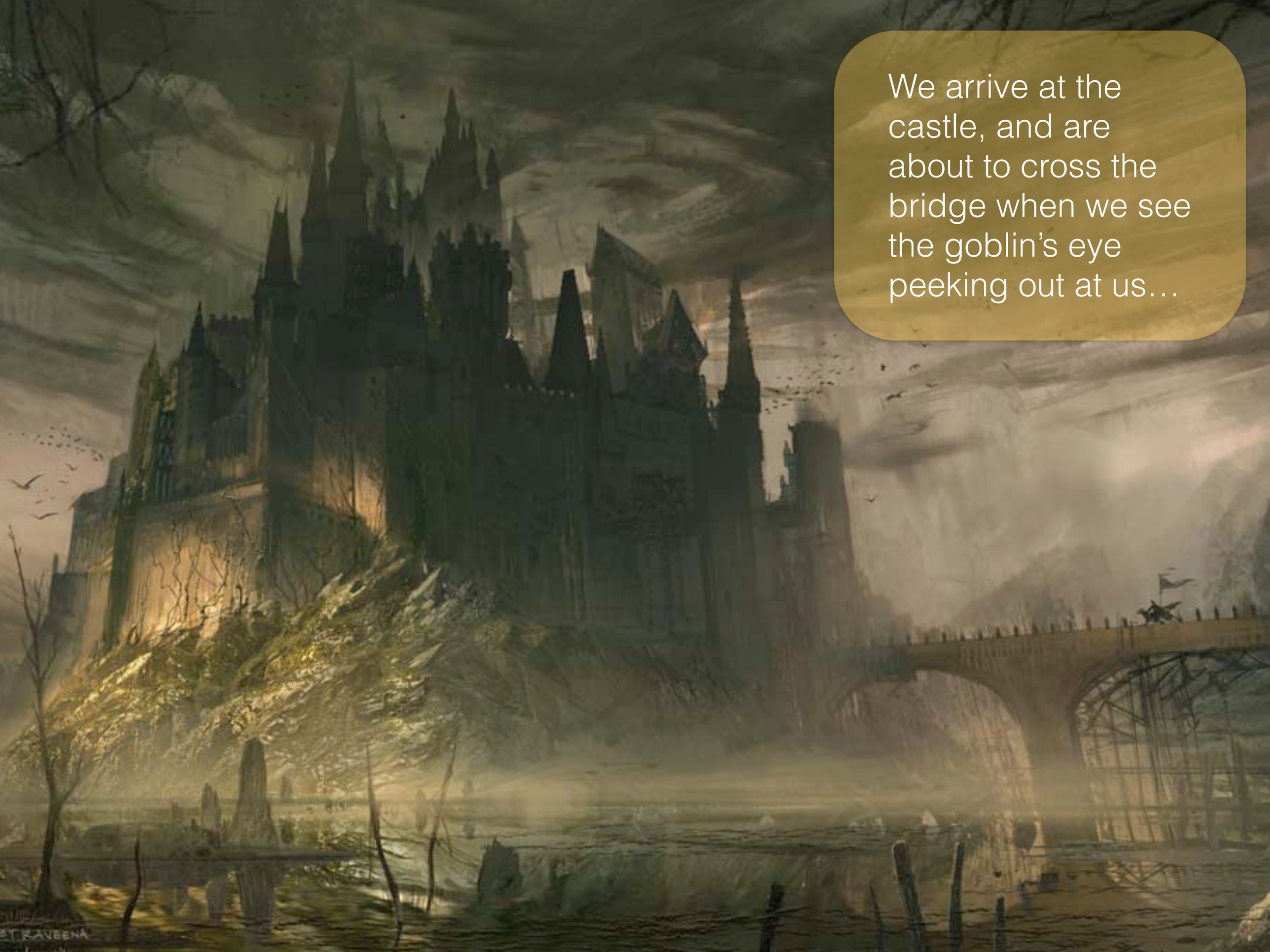
1) *To sneak past the goblin who lurks beneath the bridge in the castle moat, we must have a sleep potion. Easily lured by food and drink, he should readily accept a somnolent brew.*
2) *The guards outside the dungeon door are brutish but dull-witted, and we should encounter no trouble from them with a simple elixir of invisibility.*
3) *Unknown are the other evils we may encounter, so lest we find ourselves in dire straits, a draft of poison we must have on hand.*

Please, dear ones, make haste! My life and the future of our great land lie in your hands.

Gratefully yours,
Princess Calcula

Wizard Library

We quickly take everything,
and run out the door!



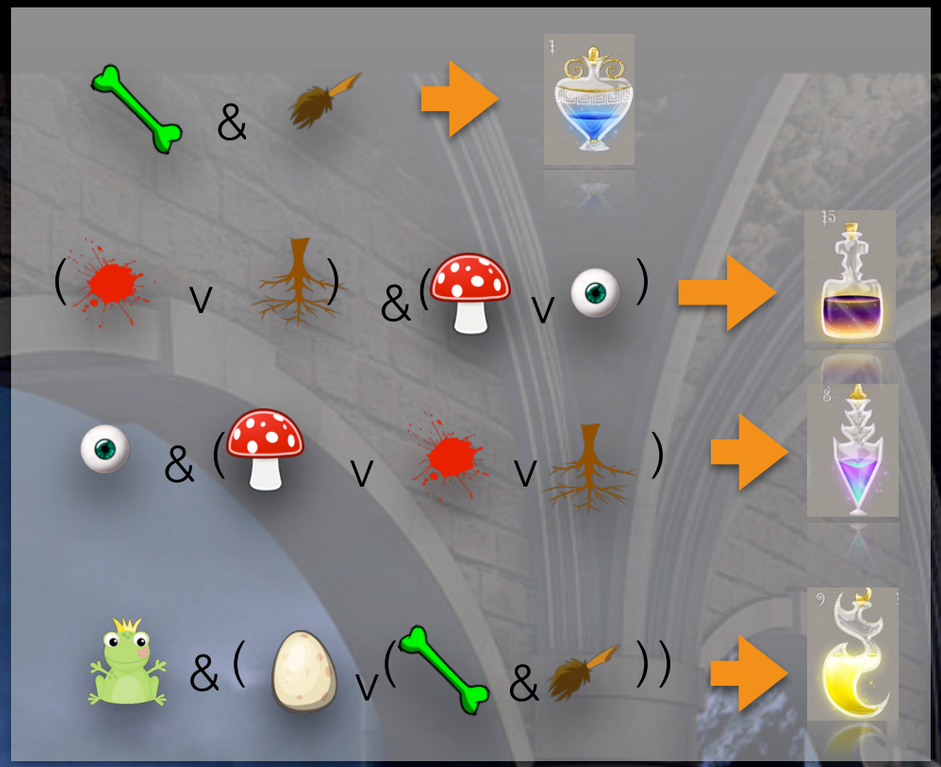
We arrive at the castle, and are about to cross the bridge when we see the goblin's eye peeking out at us…

As the princess advised, we need to construct a sleeping potion and somehow feed it to the goblin.

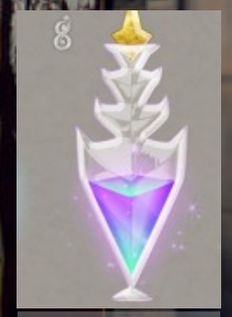
What should we use?

?


We climb the tower to where the princess's chamber is located.



As we peek around the corner, we see the guards! They look very alert, so we need an invisibility potion to sneak by them



?

Finally, we have arrived!
But it looks like we are too late …

Dearest Math Wizards,

You have saved my beloved bride Calcula. Please accept my humble gratitude.

Thank you for your bravery, cunning wit, and service!

Sincerely,

Prince Calcula

Logic

We just did math!

There is actually an entire formal language called

Predicate Logic

which is the study of true/false math!

Proofs - Conditional Strategy

If [hypothesis], then [conclusion].

statements you assume to be true (given)

what you want to show (goal)

already proven statements

Theorems
1. ...
2. ...
3. ...

Proofs - Conditional Strategy

If [hypothesis], then [conclusion].

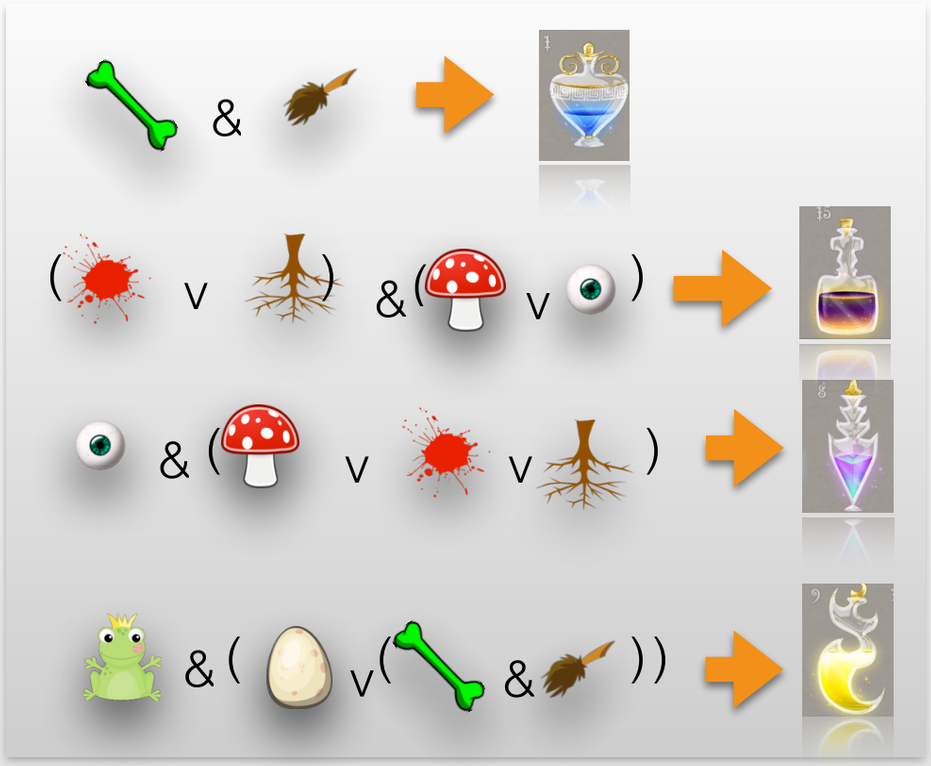
statements you assume to be true (given)

what you want to show (goal)

already proven statements

Theorems
1. …
2. …
3. …

A proof is the logical connections between the given statements and the goal. The connections are made by using already proven statements

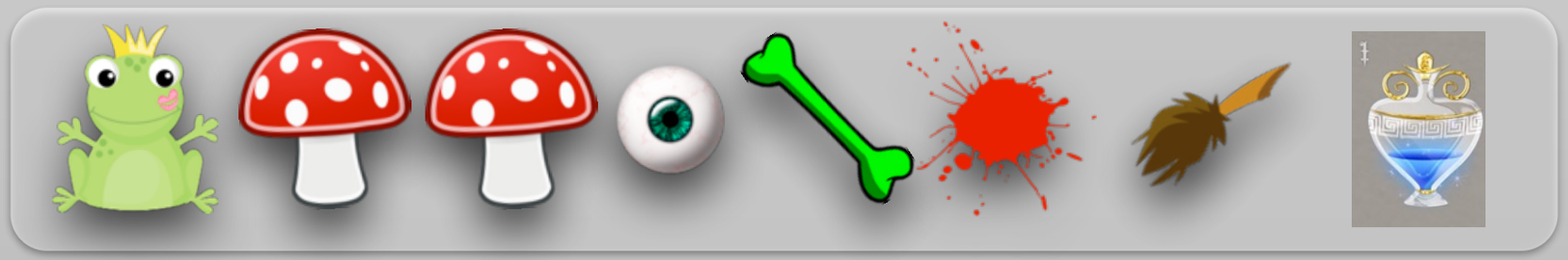


You actually proved something!

proven statements
(relationships we know are true)

goal

given statements



More Formally…

Prove that if we have these facts

then we know

is possible.

You actually proved something!

by using proven statements

Logic - Implies

p → q

"If p, then q"

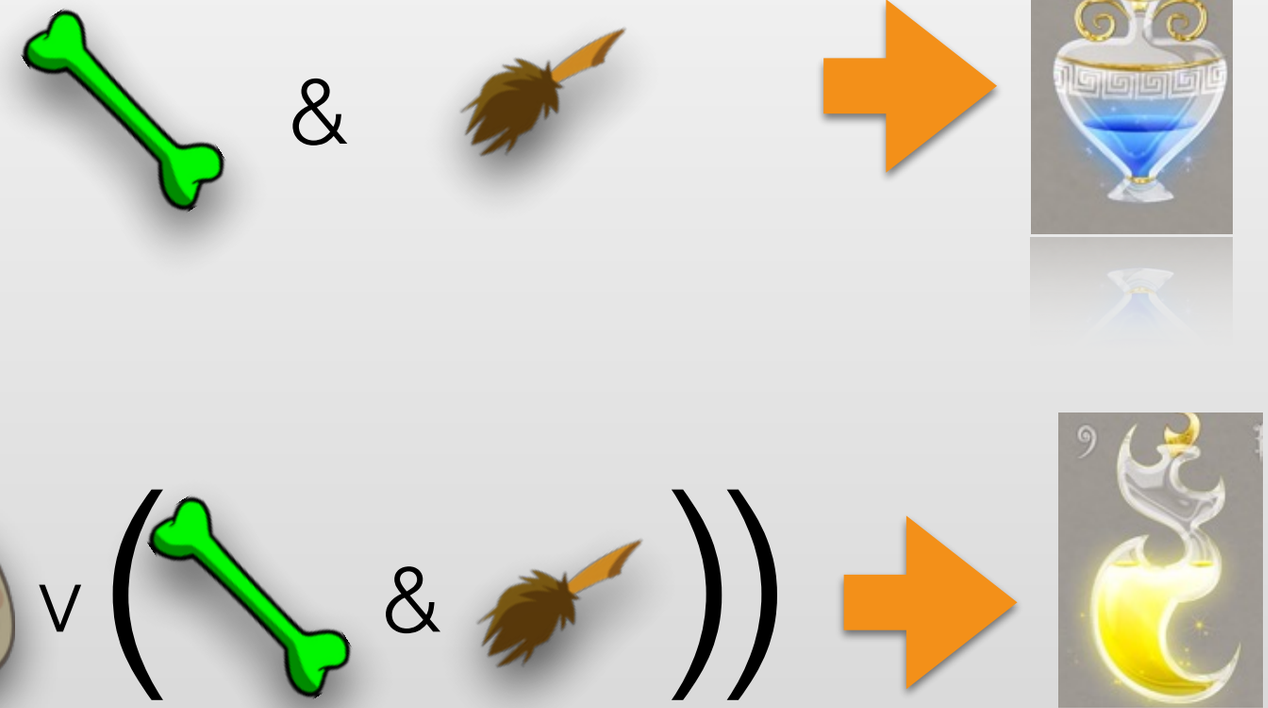
for potion logic:

"If I have this" → "I get that"

for math logic:

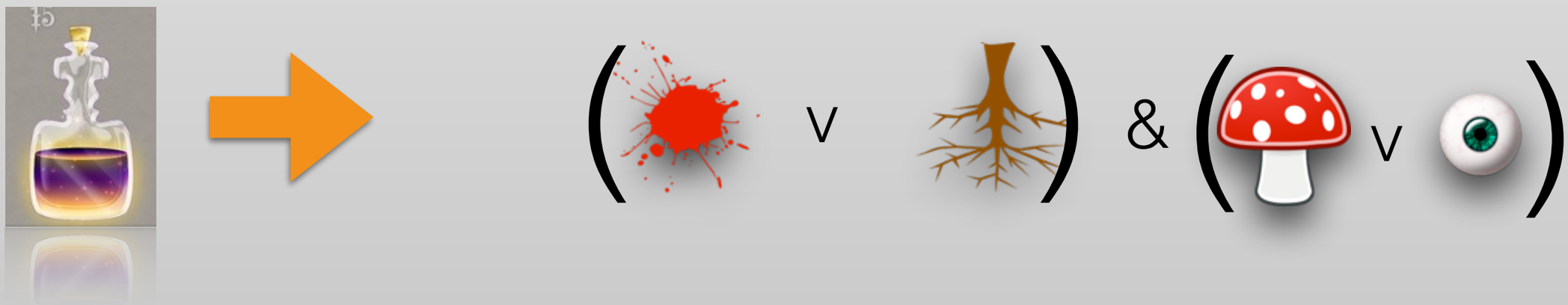
"If this side is true" → "then this side is true"

Logic - Linking



Logic - Converse

Can we do this?



Logic - Contrapositive

Is this true?

¬  → ¬ (( v ) & ( v ))

Leave the course and
take a survey!

The End

If you liked this class and want to learn more about logic and proofs then you can enroll in our geometry course!